Western Surgical Association
2020 Annual Meeting
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– Virtual Meeting –
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Q 6. PRE-SURGICAL POSITRON EMISSION TOMOGRAPHY IMAGING PREDICTS POST-NEOADJUVANT CHEMOTHERAPY PATHOLOGICAL RESPONSE IN PANCREATIC DUCTAL ADENOCARCINOMA

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Background: Neoadjuvant chemotherapy (NAC) is increasingly utilized in patients with borderline/locally advanced (BL/LA) pancreatic adenocarcinoma (PDAC) prior to resection. Major pathologic response (complete/near-complete) has been identified as a significant survival factor; however, this is only known post-resection. Anatomical (CT/MRI) and/or biochemical (CA19-9) markers have limited predictive utility. Functional metabolic imaging, fluorodeoxyglucose (FDG)-positron emission tomography (PET/CT or PET/MRI), may provide insight into tumor viability after NAC. This study aimed to to evaluate post-NAC PET in predicting pathologic response in patients with BR/LA PDAC.

Methods: This is a single-center retrospective analysis of BR/LA PDAC patients who received NAT then underwent PET scan within 60 days of resection. Major pathologic response was graded according to College of American Pathologists: Score 0 - complete response/no viable cancer, Score 1 - near-complete response, Score 2 - partial/moderate response, and Score 3 - poor/no response. Patients were classified into: major pathologic response (Scores 0/1) or minor pathologic response (scores 2/3). Metabolic (PET) response was defined as FDG uptake of the tumor compared to background tissues and dichotomized to: Major (Complete/near-complete metabolic response) or Minor (persistent FDG activity). Biochemical response (CA19-9) was dichotomized to: Optimal (baseline CA19-9 normal and stayed normal or normalized after NAC) or Suboptimal (baseline CA19-9 elevated and stayed elevated after NAC or non-secretors). Both metabolic (PET) and biochemical (CA19-9) responses were compared to final pathologic response categories considering the following diagnostic testing accuracy measurements: sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), positive likelihood ratio (LR+) and negative likelihood ratio (LR-). P-value≤0.05 was considered statistically significant. Overall survival (OS) was assessed.

Results: One hundred fifty-four patients were included in this study. The median follow-up was 23.5 months. There were 113(73.4%) patients alive at last follow-up with a median OS that was not yet reached with a 5-year OS of 56%. Major pathologic response was associated with OS (37.1 months vs. not yet reached, p=0.04). Sixty-three patients (41%) had major pathologic response on final histologic examination. Of those,

59(94%) had major metabolic response on preoperative PET. Of the 91(59%) patients with minor pathological response, only 24(26%) had major metabolic response. Of those patients with no pathologic treatment response (Score 3), 100% had measurable FDG tumor activity after NAC. Major metabolic response highly correlated with major pathologic response ($p<0.0001$) with a sensitivity and specificity of 0.94 (95% CI:0.85–0.98) and 0.74 (95%CI:0.64–0.82), respectively (PPV=0.71, NPV=0.94, LR+=3.6, LR-=0.09). Biochemical response weekly correlate with pathologic response ($p=0.04$) with sensitivity and specificity of 0.77 (95% CI:0.65–0.86) and 0.4 (95%CI:0.31–0.51), respectively (PPV=0.47, NPV=0.71, LR+=0.1.28, LR-=0.58).

Conclusion: Among BL/LA PDAC patients who received NAC, preoperative PET appears to have significant utility in predicting pathologic response, a surrogate of effective chemotherapy and survival after resection. Given the poor ability of standard imaging or biomarkers to assess NAC responses, functional FDG-PET imaging may provide significant insight into the adequacy of NAC. Such preoperative metabolic data may either support moving with resection or considering chemotherapeutic switch. Larger prospective studies are warranted and currently ongoing to investigate the role of functional imaging in PDAC treatment response assessment.